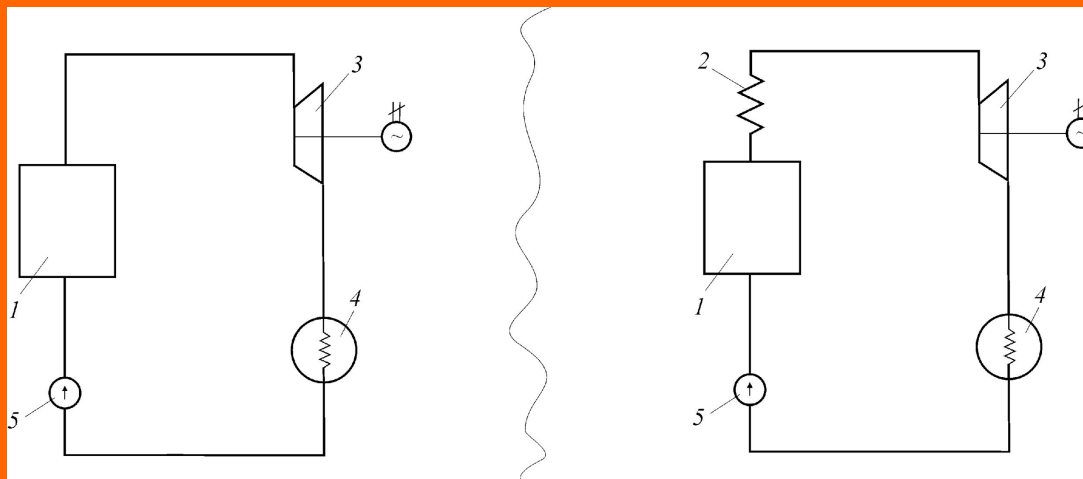
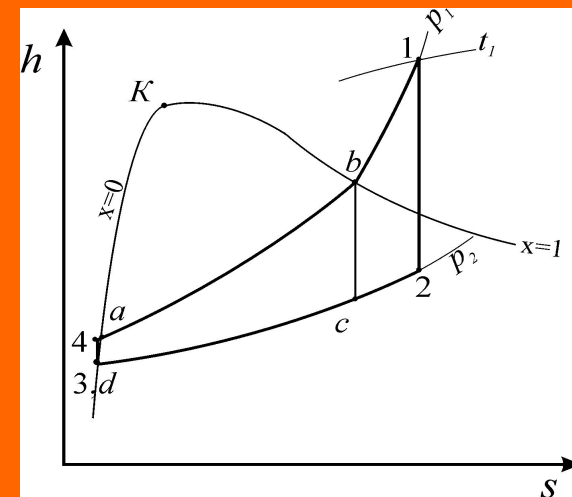
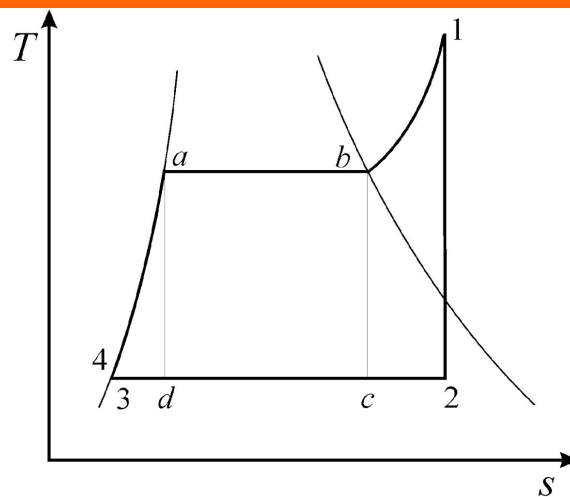
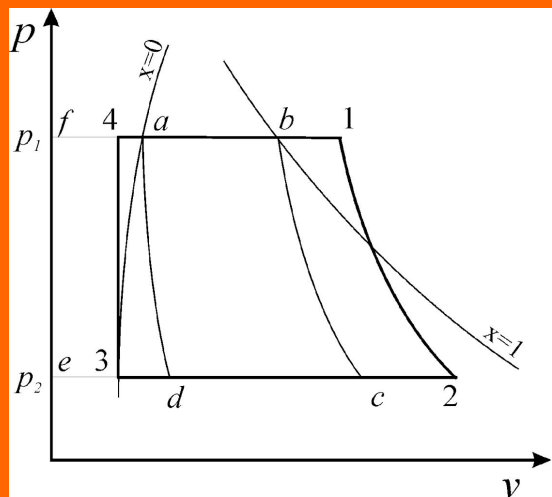


# Термодинамические циклы паросиловых установок

## Схема ПСУ



## Цикл Ренкина и КПД



$$l_y = w_m + w_H = (h_1 - h_2) - (h_4 - h_3);$$

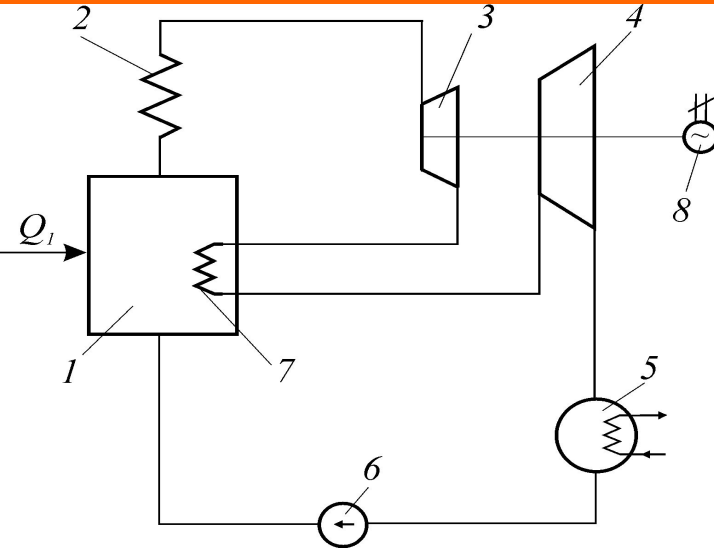
$$q_{\text{нодв}} = h_1 - h_4; \quad h_4 = h_3 + |w_H| = h_3 + v'_3 \cdot (p_1 - p_2)$$

$$\eta_t = \frac{l_y}{q_{\text{нодв}}} = \frac{(h_1 - h_2) - v' \cdot (p_1 - p_2)}{(h_1 - h_3) - v' \cdot (p_1 - p_2)} \approx \frac{h_1 - h_2}{h_1 - h_3}$$

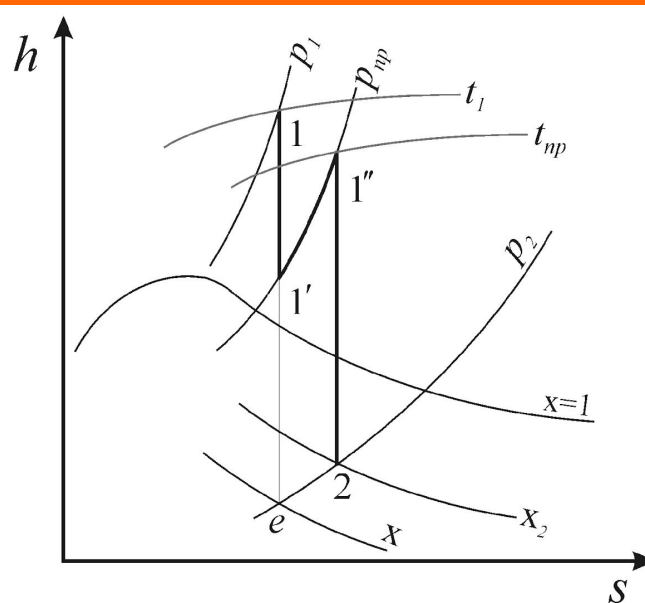
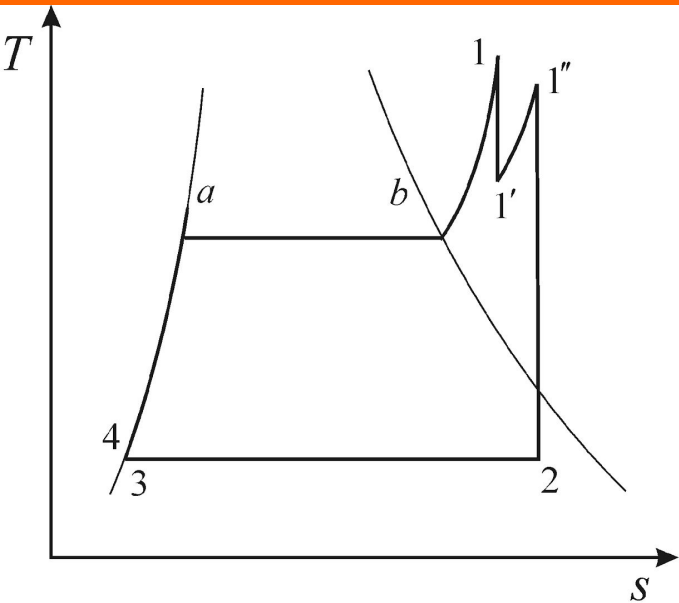
$$d = \frac{3600}{w_m} = \frac{3600}{h_1 - h_2}, \text{ кг } / (\text{кВт} \cdot \text{ч})$$

# Влияние начальных и конечных параметров на КПД цикла Ренкина

## Цикл ПСУ с промежуточным перегревом

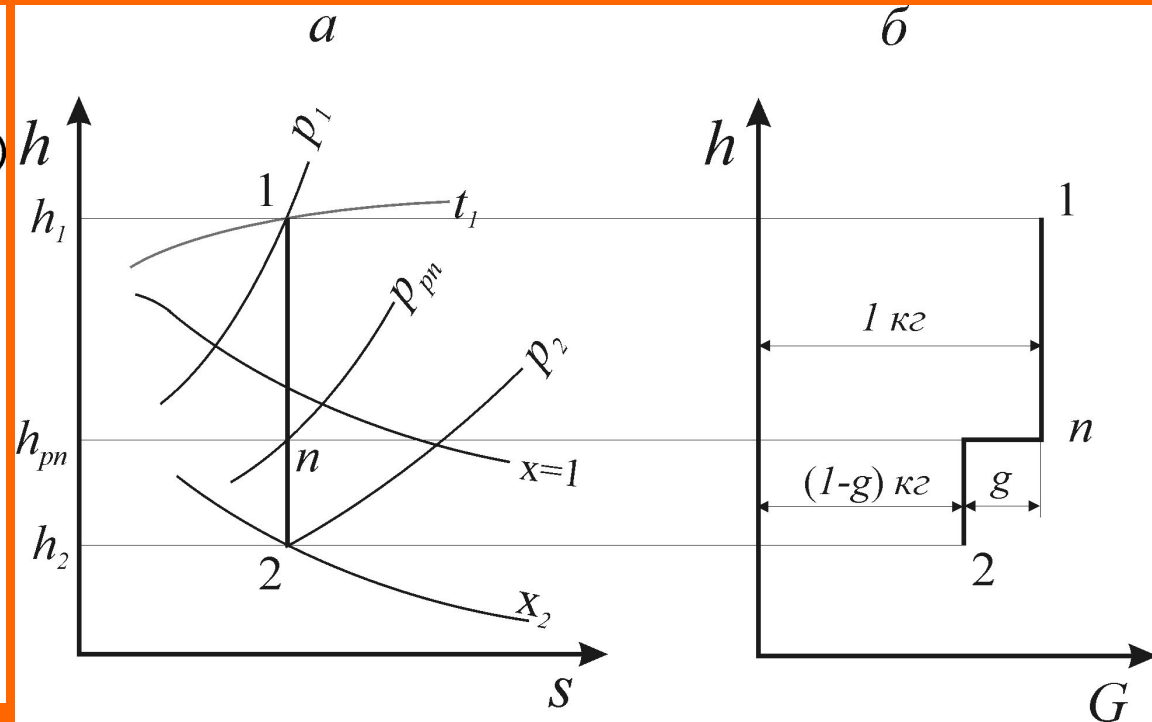
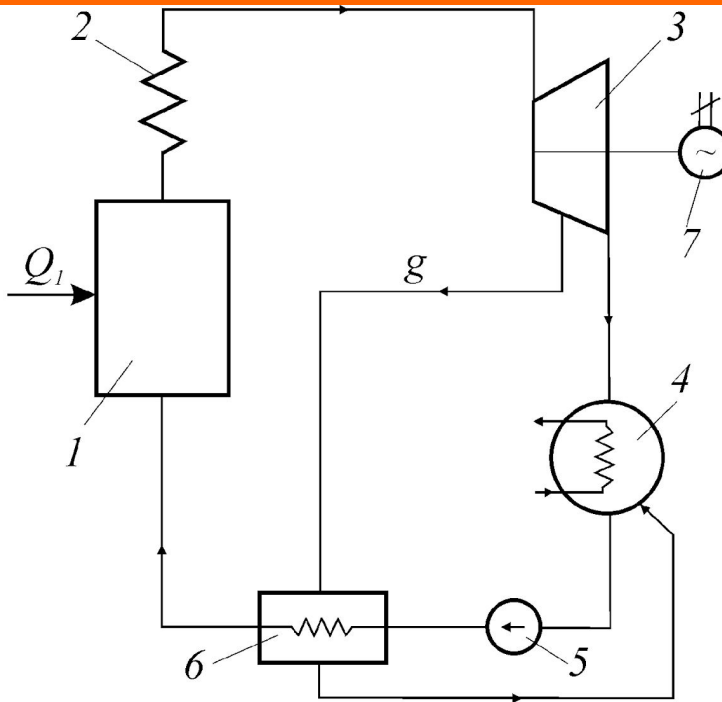


$$\eta_t = \frac{l_u}{q_{подв}} \approx \frac{(h_1 - h_{1'}) + (h_{1''} - h_2)}{(h_1 - h_3) + (h_{1''} - h_{1'})}$$



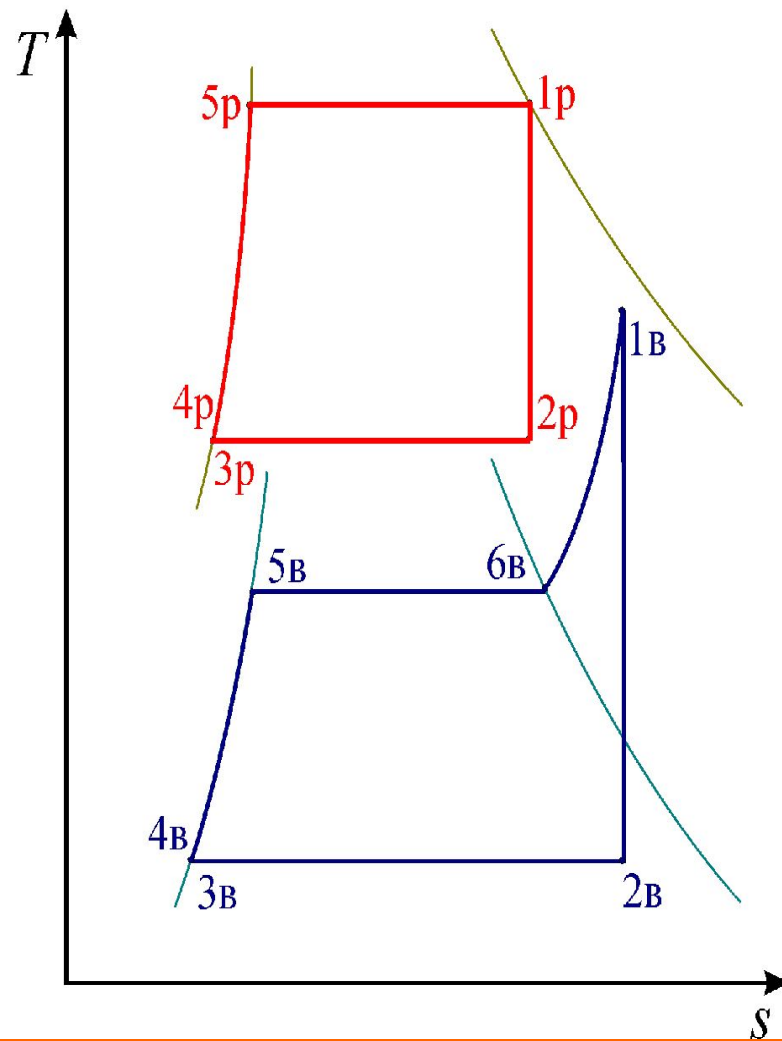
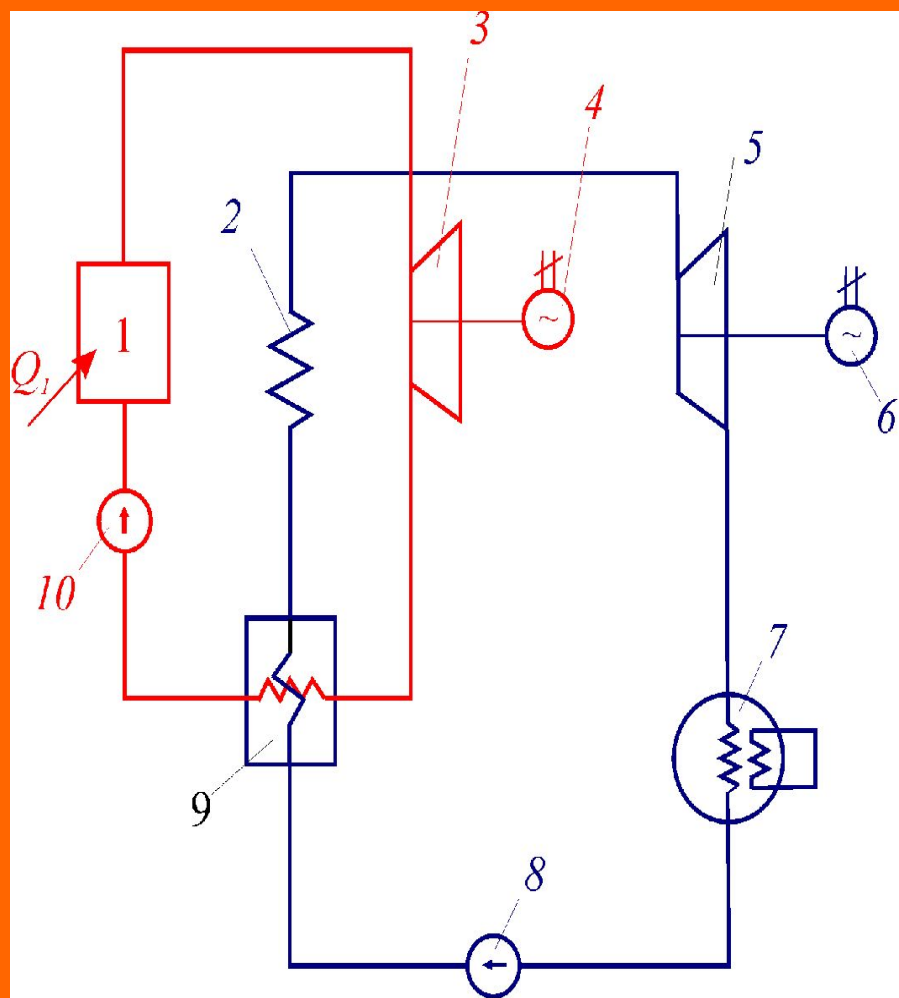
# Методы повышения экономичности ПСУ

## Регенеративный цикл

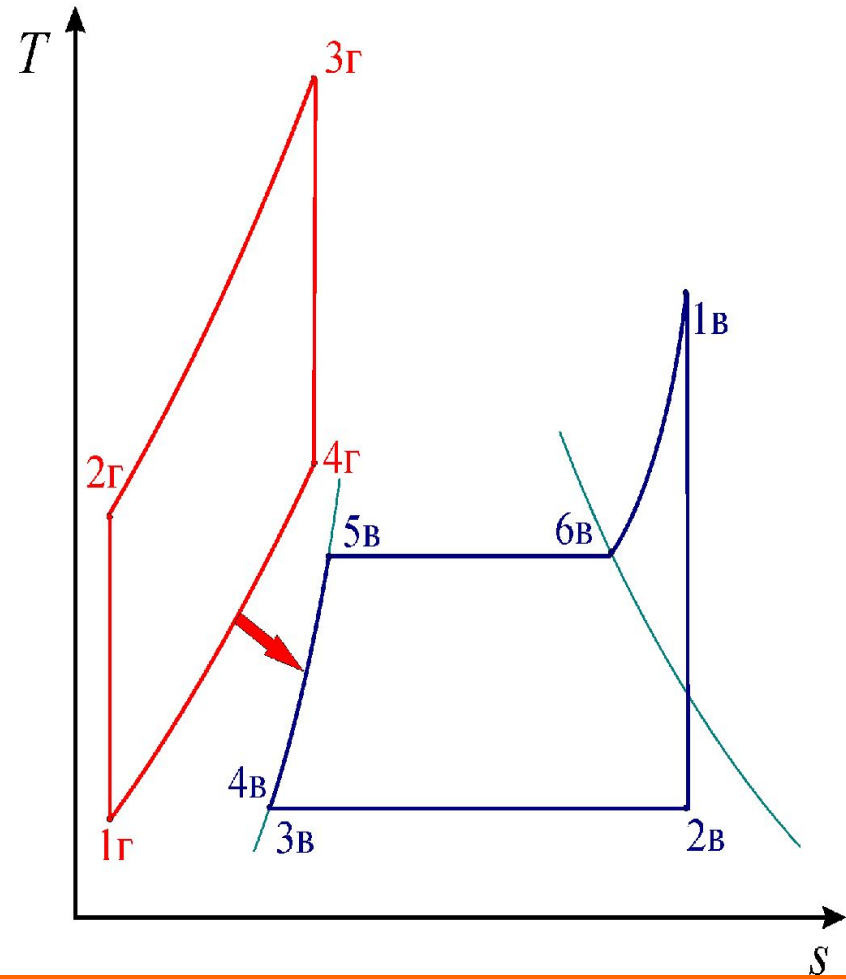
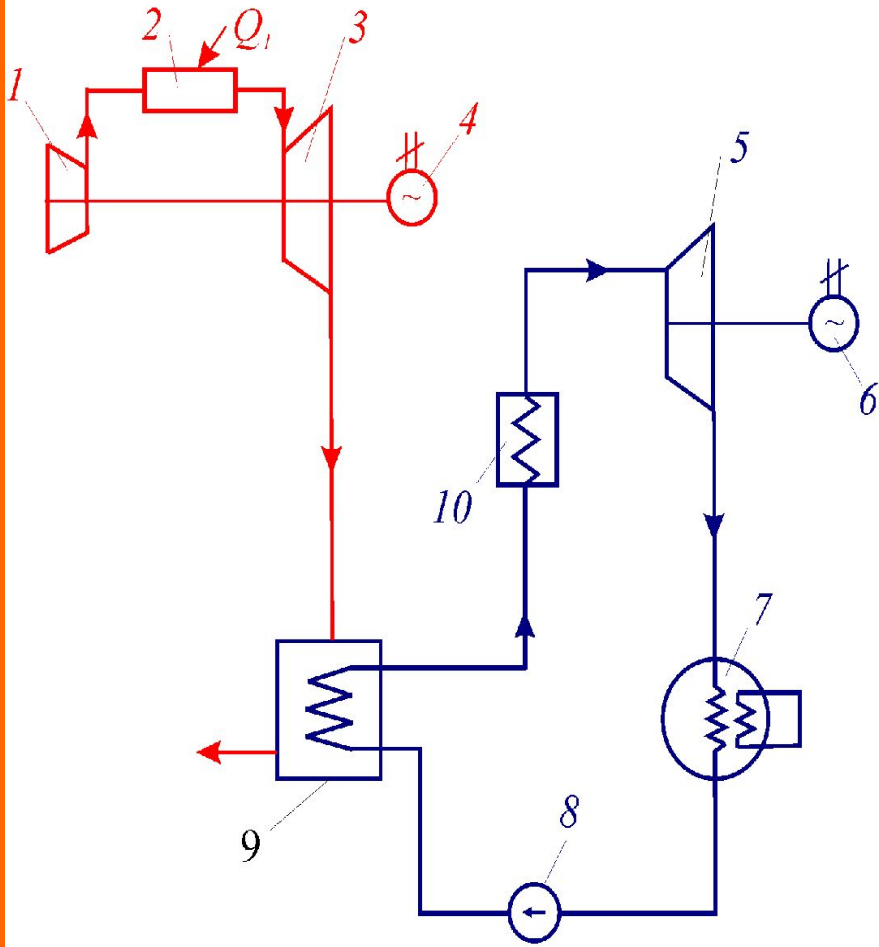


$$w_m = w_1 + w_2 = h_1 - h_{pn} + (h_{pn} - h_2) \cdot (1 - g)$$

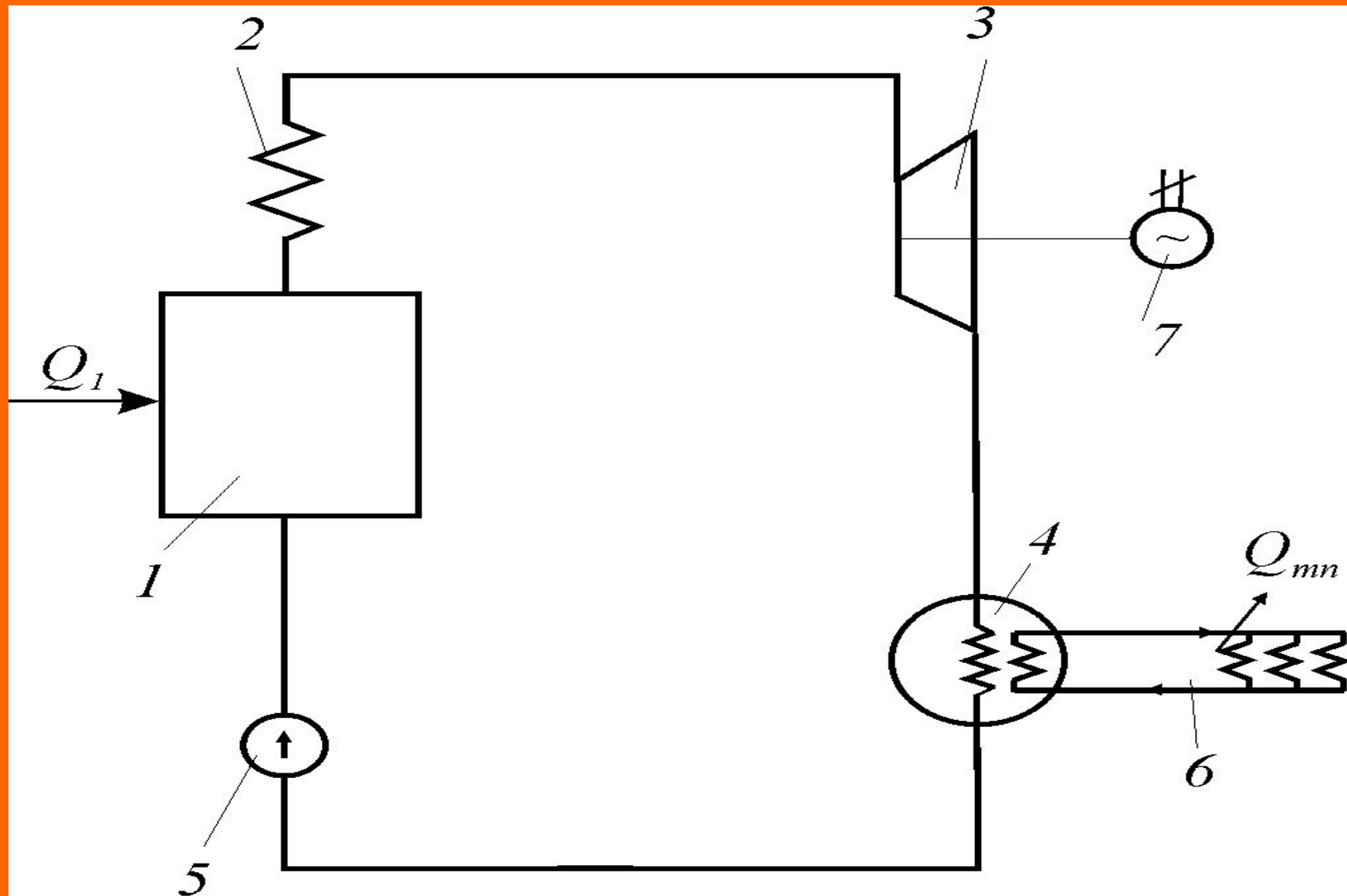
# Бинарный цикл



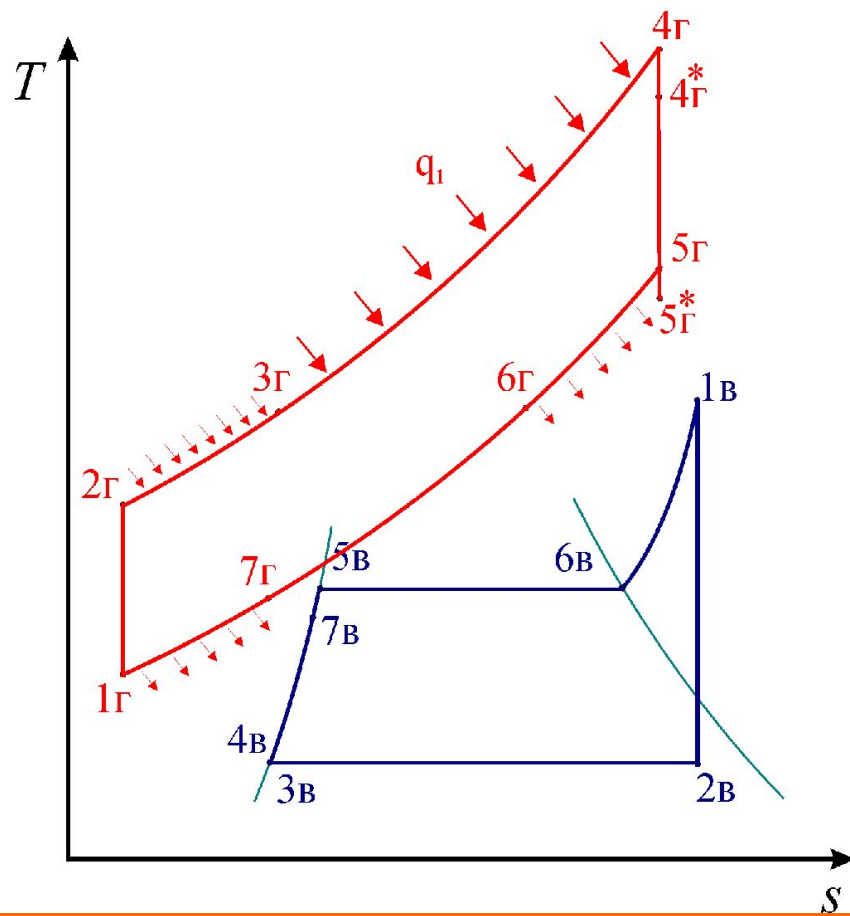
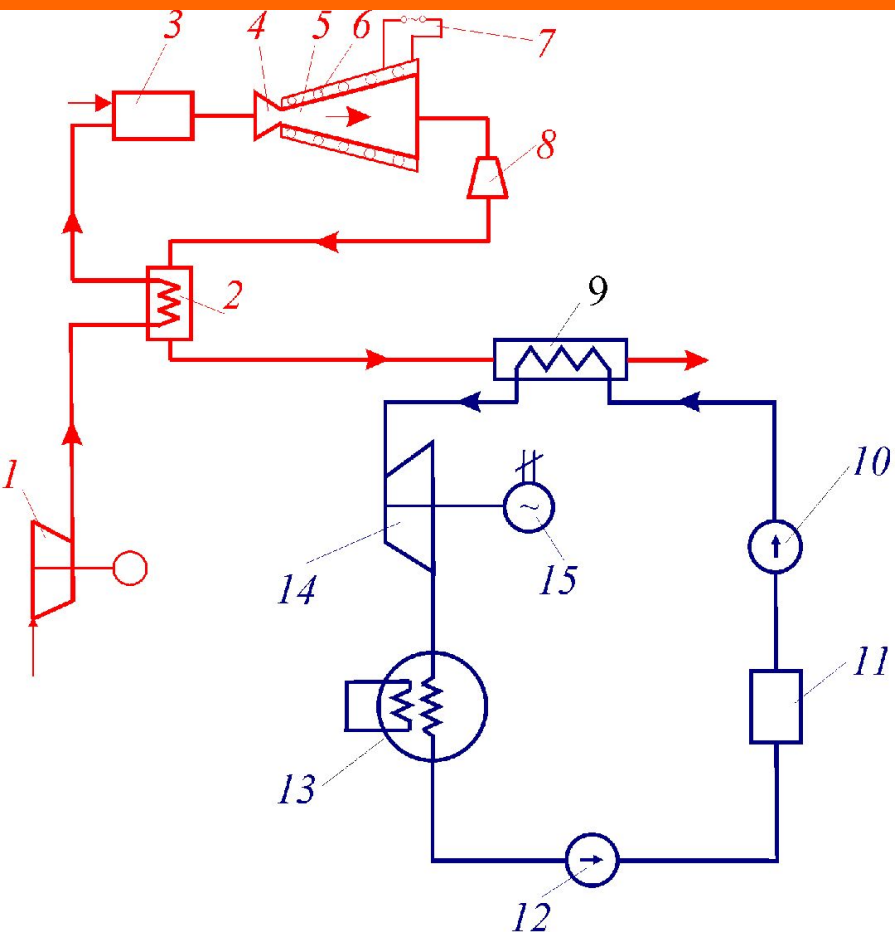
# Парогазовый цикл



# Теплофикационный цикл



# Цикл с МГД-генератором



$$m = \frac{h_{1в} - h_{7в}}{h_{6г} - h_{7г}};$$

$$\eta_t^{МГД} = \frac{m(h_{4г} - h_{5г}) + (h_{1в} - h_{2в})}{m(h_{4г} - h_{3г})}.$$